

IN THE CLAIMS

Claim 1. (currently amended) A decoding apparatus comprising:

acquiring means for acquiring encoded data ~~in a method~~ described by performing a partial-response equalization on the encoded data using a first finite state transition diagram; wherein the first finite state transition diagram accords with a run length limited code; and

means for detecting and decoding the acquired encoded data by using a trellis corresponding to a second finite state transition diagram that is a combination of the first finite state transition diagram and intersymbol interference, the trellis satisfying both a run length limitation of the run length limited code and a partial-response characteristic of the partial-response equalization, said encoded data having been generated by encoding an information series;

wherein the second finite state transition diagram includes states defined based on values of a non-return to zero coding of states in the first finite state transition table.

Claim 2. (previously presented) The decoding apparatus according to claim 1, wherein the first finite state transition diagram accords with (2, 7) run length limited code conversion rules.

Claim 3. (previously presented) The decoding apparatus according to claim 1, wherein the first finite state transition

diagram accords with (1, 7) run length limited code conversion rules.

Claim 4. (previously presented) The decoding apparatus according to claim 1, wherein the intersymbol interference is based on a partial-response equalization system.

Claim 5. (previously presented) The decoding apparatus according to claim 1, in which the encoded data is further encoded into one of low density parity check (LDPC) codes and turbo codes and said decoding means comprises first decoding means, and which further comprises second decoding means for receiving the information decoded by the first decoding means and decoding one of the LDPC codes and turbo codes.

Claim 6. (previously presented) The decoding apparatus according to claim 1, which further comprises reproducing means for reproducing the encoded data generated in the method described by the first finite state transition diagram, and in which the decoding means uses the trellis corresponding to the second finite state transition diagram, thereby to decode the encoded data that the reproducing means has reproduced from a recording medium.

Claim 7. (previously presented) The decoding apparatus according to claim 1, which further comprises receiving means for receiving the encoded data generated in the method described by the first finite state transition diagram and transmitted via

a predetermined communication path, and in which the decoding means decodes the encoded data received by the receiving means by using the trellis corresponding to the second finite state transition diagram.

Claim 8. (currently amended) A decoding method comprising the steps of:

~~acquiring encoded data generated by encoding an information series in a method described by performing a partial-response equalization on the encoded data using a first finite state transition diagram; wherein the first finite state transition diagram accords with a run length limited code; and~~

~~detecting and decoding the encoded data acquired in the step of acquiring by using a trellis corresponding to a second finite state transition diagram that is a combination of the first finite state transition diagram and intersymbol interference; the trellis satisfying both a run length limitation of the run length limited code and a partial-response characteristic of the partial-response equalization;~~

wherein the second finite state transition diagram includes states defined based on values of a non-return to zero coding of states in the first finite state transition table.

Claim 9. (currently amended) A program storage medium storing a computer-readable program that describes the steps of:

~~acquiring encoded data generated by encoding an information series in a method described by performing a partial-response equalization on the encoded data using a first finite state~~

transition diagram; wherein the first finite state transition diagram accords with a run length limited code; and

detecting and decoding the encoded data acquired in said step of acquiring by using a trellis corresponding to a second finite state transition diagram that is a combination of the first finite state transition diagram and intersymbol interference; the trellis satisfying both a run length limitation of the run length limited code and a partial-response characteristic of the partial-response equalization;

wherein the second finite state transition diagram includes states defined based on values of a non-return to zero coding of states in the first finite state transition table.

Claim 10. (canceled)

Claim 11. (currently amended) A recording/reproducing apparatus comprising:

encoding means for encoding an information series in a ~~method described by~~ performing a partial-response equalization on the encoded data using a first finite state transition diagram; wherein the first finite state transition diagram accords with a run length limited code;

recording/reproducing means for recording and reproducing data encoded by the encoding means, in and from a recording medium; and

detecting and decoding means for detecting and decoding the encoded data reproduced by the recording/reproducing means by using a trellis corresponding to a second finite state

transition diagram that is a combination of the first finite state transition diagram and intersymbol interference; the trellis satisfying both a run length limitation of the run length limited code and a partial-response characteristic of the partial-response equalization;

wherein the second finite state transition diagram includes states defined based on values of a non-return to zero coding of states in the first finite state transition table.